

**REMARKS**

Reconsideration of this application is respectfully requested.

The objections to claims 7 and 13 have been overcome by the amendments suggested in the action.

Rejection of claims 1, 4, 7 and 9 as being anticipated by Manica (U.S. Patent No. 5,679,245) is traversed. Manica discloses an blood circuit that does not include a pressure sensor. Rather, the pressure sensor is on the pump console. The blood circuit connects to the pressure sensor only when the blood circuit is on the pump console. In contrast, the present invention has the pressure sensor fixed or attached to the blood cartridge. Because Manica does not disclose a pressure sensor fixed or attached to cartridge, there can be no anticipation.

The rejection of claims 5, 6, 10, 11 and 13-19 as being obvious over Manica in view of Bollister (U.S. Patent No. 6,171,253) is traversed. The prior art teaches away from the claimed invention by disclosing pressure sensors that are permanently mounted on a pump console. The applied prior art does not teach or suggests a pressure sensor fixed to a disposable blood circuit or physically isolated from the pump console. Moreover, there is no recognition in the prior art that there is any problem with attaching the pressure sensors on pump console; of difficulties with membranes covering the console mounted pressure sensors; or of pump and sensor performance difficulties due to diaphragms inserted between the permanent pressure sensor and the blood vessel.

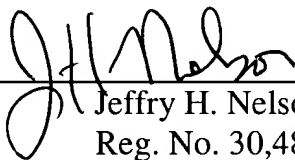
It was a recognition of the problem posed by pressure sensors permanently mounted to a pump console that led applicants to the invention of mounting disposable pressure sensors on disposable cartridges. See spec. pp. 6-7. The fact that applicants recognized the problem and then solved the problem is strong evidence of non-obviousness. Moreover, it is improper to reject the invention for obviousness without any showing that the prior art even recognize the problem solved by applicants, or of any motivation evident from the prior art to mount pressure sensors on disposable cartridges.

All claims are in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone applicants' attorney. Prompt reconsideration and allowance of this application is requested.

Attached hereto is a marked-up version of the changes made to the specification and claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: \_\_\_\_\_  
Jeffrey H. Nelson  
Reg. No. 30,481

JHN:glf  
1100 North Glebe Road, 8th Floor  
Arlington, VA 22201-4714  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS**

1. (Amended) A disposable cartridge for mounting on a blood pump [system] device comprising:
  - a. said cartridge attachable to said blood pump and said cartridge supporting an attached blood passage, wherein the blood pump engages the blood passage when said cartridge is attached to the blood pump, wherein through said [a] blood passage [through which] flows blood withdrawn [from a blood vessel] from a patient, and
  - b. an electronic pressure sensor [mounted on] fixed to the cartridge, where the pressure sensor is arranged to sense a pressure in the blood flow through the blood passage of the cartridge and outputs an electrical signal indicative of the pressure and wherein the pressure sensor is structurally isolated from said blood pump.
4. (Amended) A cartridge as in claim 3 further comprising a filtered fluid passage extending from the filter, and a second pressure sensor in the filtered fluid passages sensing a pressure of filtered fluid flowing through the filtered fluid passage, wherein said second pressure sensor is mounted on the cartridge and structurally isolated from the blood pump.
6. (Amended) A cartridge as in claim 1 where the sensor is integrated into the housing of a hemofilter and the hemofilter is mounted on the cartridge.
7. (Amended) A cartridge as in claim 1, where the pressure sensor and a pump coupling loop of the blood passage are mounted on the cartridge housing and the

cartridge [that] detachably attaches to [a] the pump [console] device such that the pump device engages the loop.

8. (Amended) [An integrated disposable] A cartridge as in claim 7 where the blood passage is formed of transparent material so that the blood flow is visible.

13. (Amended) A cartridge as claim 1 wherein the pressure sensor is sealed in a pressure sensor housing [form] formed of a biocompatible and flexible material, and the sensor housing includes an integral and flexible membrane in contact with the blood and electronic sensors.

16. (Amended) A disposable [extracorporeal] extracorporeal blood circuit for processing blood from a mammal comprising:

a blood passage having a blood withdrawal port connectable to [a first] a withdrawal peripheral blood vessel of the mammal, a blood return port connectable to a [second] return peripheral blood vessel of the patient, and a blood passage between the withdrawal port and the return port through which blood flows wherein the blood passage has a smooth and continuous wall throughout the passage;

a pressure sensor having a fluid passage with a fluid inlet [and/or] or outlet coupled to said blood passage, and a fluid pressure responsive element flush with a wall of the fluid passage, [and]

a blood filter having a blood inlet and a blood outlet both coupled to said blood passage such that the blood flows through said filter, and

a cartridge to which is attached the blood passage, pressure sensor and blood filter, and said housing is detachably mountable to a blood pump, and wherein said cartridge

includes an electrical connection for electrically coupling the pressure sensor to the blood pump.

17. (Amended) A disposable extracorporeal blood circuit as in claim 16 wherein said blood passage includes a tubular withdrawal line connectable to a first catheter inserted into the first peripheral blood vessel[,] and to said pressure sensor, a tubular blood circuit line connecting the pressure sensor and the blood inlet of the filter, and a tubular return line connected to the blood outlet of the filter and connectable to a catheter inserted in said second peripheral blood vessel.

18. (Amended) A disposable extracorporeal blood circuit as in claim 17 wherein the tubular blood circuit line is connectable to a roller blood pump of the blood pump.

19. (Amended) A disposable extracorporeal blood circuit as in claim 16 wherein the [first] withdrawal and [second] return peripheral blood vessels are the same blood vessel.